

Project Title:

Progenitors to Geoeffective Coronal Mass Ejections: Filaments and Sigmoids

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Project Information:

Coronal mass ejections -- particularly those with flux rope structures -- have the potential to trigger geomagnetic storms, depending on the properties of the flux ropes. Because of the increasing importance of geoeffectiveness, it is desirable to be able to predict coronal mass ejections, and to predict how geoeffective they may be. Analyses of coronal sigmoids (e.g., Canfield et al. 1999, Leamon et al. 2002) have indicated sigmoid eruptions are important drivers of space weather. Chromospheric filaments and sigmoids both have been modeled with flux rope structure; however Leamon et al. (2002) suggested that magnetic clouds associated with filament eruptions are different from magnetic clouds associated with erupting sigmoids. If the potential for geoeffectiveness depends on the details of the pre-eruption magnetic structures, can the characteristics of magnetic clouds at 1 au be related statistically to measurements made via remote sensing, e.g. via X-ray coronal imagery and/or photospheric magnetography? This investigation will address this question, by combining data from solar observatories like Yohkoh/SXT, SoHO/MDI with near-Earth monitors like ACE, WIND, etc., to explore possible systematic differences between filaments and sigmoids and the magnetic clouds which are associated with them.

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